

PLANER

Series 300 & 500: Instructions for Use

en

Original Instructions

Series 300 & 500: Instructions for Use

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Table of Contents

Section I Introduction	1
1 Notices	2
2 Symbols	2
Symbols used in this manual	2
Symbols used on the equipment	3
3 Safety precautions	4
First aid	4
Safety	4
Equipment	4
Liquid nitrogen and vessels	5
EMC Precautions	6
4 Indications for use	7
5 Theory of operation	7
6 Equipment overview	7
Guide to the controller	7
Screen layout.....	8
Connections	8
Section II Operating the equipment	9
1 Installation	10
Installing the liquid nitrogen supply	10
2 Loading printer paper	11
3 Using a Planer pump and dewar	12
Filling the dewar	12
Fitting the pump	12
Testing and pressuring the dewar	14
Removing the pump	15
4 Configuring the controller	16
Configuring the system	16
Entering a profile	17
5 Freezing samples	18
Preparing the nitrogen supply	18
Starting the run	18
Loading the samples	19
Removing the samples	19
6 Reports	20
7 Switching off the system	20
Section III Routine maintenance and troubleshooting	21
1 Routine maintenance	22

2	Calibrating the system	23
3	Troubleshooting	23
	Unexpected reset	23
	The run has stopped prematurely	24
	The chamber will not cool	24
	The chamber will not heat	24
	No response from the system	25
	The display is blank	25
	Returning for service	25
4	Disposal	25

Section IV Additional information 27

1	Specifications	28
	System specifications	28
	Controller specifications	29
	Chamber specifications	30
	Fuses	30
2	External alarms	31
3	EU Declaration of Conformity	32

Section



1 Introduction

This document contains important information concerning the safe use of the equipment. Ensure that you have read and fully understand these instructions before attempting to use this equipment.

1.1 Notices

This equipment contains batteries and other components that have a limited life. To ensure the long life of the equipment and help ensure trouble-free operation, we recommend that you join one of our Maintenance and Support Schemes. Please contact your supplier for details.

Good practice demands that in critical applications, reliance should not be placed on a single source of data. Hard copies and backup copies should be routinely kept.

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Planer plc reserves the right to alter products and their specifications without notice.


1.2 Symbols

1.2.1 Symbols used in this manual















 Warning. Information or instructions that are related to safety. Failure to follow these instructions may result in personal or third-party injury.

 Caution. Important information or instructions related to the safe use of the equipment. Failure to follow these instructions may result in damage to equipment, samples or data.

 First aid advice.

 Tips and information.

1.2.2 Symbols used on the equipment

	Caution: consult instructions for use. Failure to follow these instructions may result in personal or third-party injury.
	Caution: low temperature or freezing conditions.
	Caution: hot surface.
	Catalogue number.
	Manufacturer.
	Outlet duct.
	Mains ON
	Mains OFF
	Alternating current
	Calibration
	Manual control
	Temperature: Up/down
	Menu selection
	Enter key

1.3 Safety precautions



Warning

Ensure that you have read and fully understand these instructions before attempting to use this equipment.

1.3.1 First aid



IF IN DOUBT, SEEK IMMEDIATE MEDICAL ATTENTION.

- If any quantity of liquid nitrogen comes into contact with the skin or eyes, immediately flush that area of skin with large quantities of tepid water.
- Do not use strong flows of water as this could cause tissue damage.
- Continue to flush the area and seek medical attention.
- If the skin is blistered or there is any possibility that the eyes have been affected, the patient should be taken immediately to a doctor or hospital for treatment.

1.3.2 Safety

1.3.2.1 Equipment



Warnings

- Operating the equipment in a manner not specified within this document or under conditions outside of the specifications may result in the protection offered by the equipment being impaired.
 - Installation must only be undertaken by suitably trained personnel.
 - The equipment is classified as Class I equipment and must be earthed for safe operation.
 - The mains lead must be properly fitted to a 3-way mains connector and connected to an earthed mains outlet to maintain protection against electric shock,
 - The operator should be provided with additional protection against electric shock because of the potentially wet laboratory environment.
 - Ensure that the mains supply to the equipment is protected by a residual-current circuit breaker (RCCB) operating at a differential of 30 mA.
 - Ensure that the equipment is not compromised by faulty equipment sharing the same supply and causing nuisance trips.
 - Any electrical devices connected to the equipment must comply with either IEC 950, IEC 61010 or their equivalent.
 - The chamber and contents may get cold enough to cause frostbite when running a profile.
-

- The Series 500 chamber and contents can become hot enough to cause burns even when the equipment is not running a profile.
- The Series 500 chamber weighs 23 kg and requires at least two people for safe handling.
 - Support the weight using the bottom plate.
 - Do not attempt to lift using the edges of the case.



Cautions

- The connectors on the equipment must only be used for connection to other equipment described in this document.
- When heating under manual control, check the chamber temperature at intervals of 30 seconds or less to avoid overheating.
- User servicing is limited to cleaning and decontamination. All other servicing must only be undertaken by suitably trained engineers.
- For continued protection against risk of fire, fuses must always be replaced with fuses of the same type and rating.
- Do not move the equipment while it is still wet after a freezing run.
- Switching off the chamber at sub-zero temperatures may cause serious damage to the equipment.
- If connected to a liquid nitrogen cylinder, allow the hose to thaw and warm up to room temperature before shutting off the valve on the cylinder.
- Do not switch on the LNP4 pump power supply while the chamber is heating.

1.3.2.2 Liquid nitrogen and vessels



Warnings

- Avoid nitrogen build up. Only use liquid nitrogen in well ventilated rooms. Small volumes of liquid nitrogen convert to very large volumes of gas. This can result in drowsiness or asphyxiation.
- If liquid nitrogen is used in confined spaces, install oxygen-deficiency alarms. Guidance on ventilation requirements are given in BCGA Code of Practice CP30, "The safe use of liquid nitrogen dewars up to 50 litres".
- If there is a risk of reduced or insufficient ventilation when a room is unoccupied, oxygen deficiency alarms must be installed and positioned outside of the room so that operators are aware of the hazard before entering. The operational status of alarms should be visible from outside the room.
- If liquid nitrogen is used in an area that requires forced ventilation, an alarm to indicate failure of the ventilation must be fitted.
- When dispensing or potentially being exposed to liquid nitrogen, wear protective clothing.
 - Wear a face shield
 - Wear cryogenic protective gloves with your sleeves over the gloves.

- Do not wear short gauntlets. Liquid nitrogen can get caught in the cuffs.
- Handle vessels containing liquid nitrogen carefully.
 - Liquid nitrogen boils at -196 °C and both liquid and gas can cause rapid and severe frostbite.
 - Delicate tissue such as the eyes can be damaged by exposure to cold gas, which may be too brief to affect the skin of the hands or face.
- Stand clear of boiling and splashing liquid nitrogen and its gas when filling a dewar or when inserting objects, such as a pump, into the liquid.
- Use tongs or wear suitable protective gloves when handling cold or hot objects.
- Never remove a pump from a dewar until the pressure gauge reading has fallen to zero. This is achieved by opening the pressure relief valve mounted on the side of the pump. Avoid contact with cold nitrogen gas when depressurising the dewar.
- The dewars used with this equipment must never be used to store any liquid other than liquid nitrogen.
- Only use vessels designed for working with liquid nitrogen.
- Secure the liquid nitrogen container to prevent toppling.
- Ensure that the delivery pipe connections are secure and leak-free before supplying liquid nitrogen to the freezer.
- The liquid nitrogen pressure must not exceed 1.7 bar (25 psi).

1.3.3 EMC Precautions

Cautions

The following precautions must be taken to ensure that the equipment is not damaged by electrostatic discharge (ESD), and that its immunity to radio frequency interference is not compromised.

- Ensure that the equipment is not running and that the mains power is disconnected before connecting or disconnecting any cable.
 - Fit the plastic covers and plugs provided to all unused connectors.
 - Immediately before touching the sample temperature probe, touch an earthed part such as a metal part of the equipment's enclosure.
 - Do not touch any uncovered connectors with your hands or tools, even when the equipment is switched off.
 - When connecting the equipment to a computer, always use a fully screened cable no longer than 2 m.
 - Take care to avoid placing the equipment in environments influenced by sources of electromagnetic interference, such as large transformers.
-

1.4 Indications for use

The Series 300 and 500 models are intended to be used for cooling biological samples, following a defined temperature-time profile, as part of a cryopreservation process.

1.5 Theory of operation

The equipment is designed to cool samples by following a predefined time-temperature profile. The temperature-time relationship is referred to as the profile.

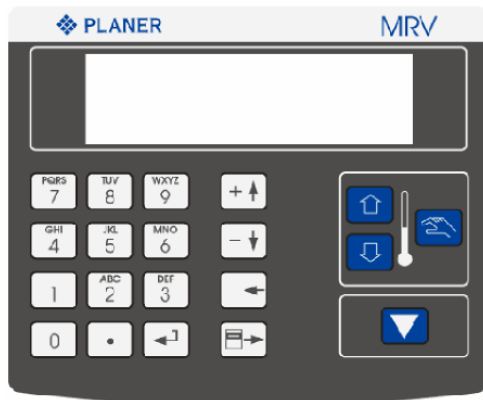
The equipment comprises two main elements:

1. Controller: measures the current temperature and adjusts the amount of liquid nitrogen or heat that is supplied to the chamber.
2. Chamber: contains the samples being cooled and houses the heater and liquid nitrogen injection components.

The chamber temperature is controlled by injecting liquid nitrogen into the chamber and by switching on an internal heater.

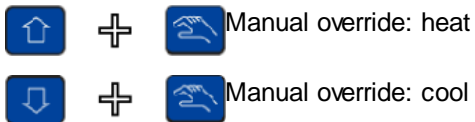
1.6 Equipment overview

1.6.1 Guide to the controller

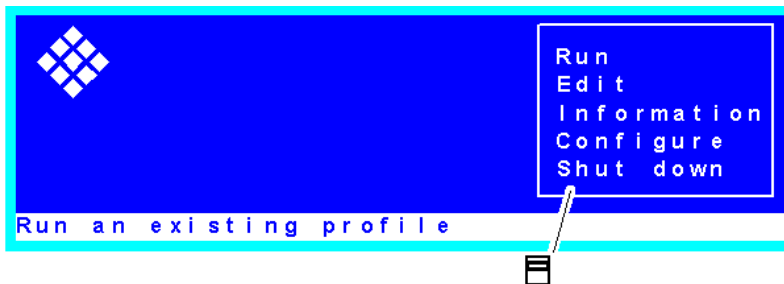


Key:

1. Contrast



1.6.1.1 Screen layout



To select a menu item, press



or



and then

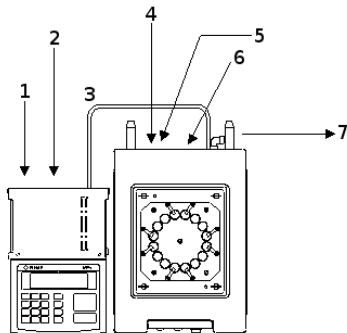


1.6.2 Connections

**Warning**

- Installation must only be undertaken by suitably trained personnel.

Typical connections to a Series 300 system are shown below.

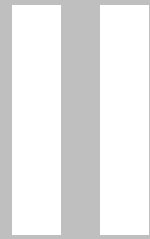


Key:

1. RS232 port
2. Alarm socket
3. 15 way cable
4. Mains power inlet
5. Power outlet for LNP4 pump
6. Platinum resistance thermometer socket
7. Hose connection to liquid nitrogen supply

Operating the equipment

Section



2 Operating the equipment

2.1 Installation



Warning

- Installation must only be undertaken by suitably trained personnel.
- Any electrical devices connected to the equipment must comply with either IEC 950, IEC 61010 or their equivalent.
- The connectors on the equipment must only be used for connection to other equipment described in this document.
- The Series 500 chamber weighs 23 kg and requires at least two people for safe handling.
 - Support the weight using the bottom plate.
 - Do not attempt to lift using the edges of the case.

1. Carefully unpack the equipment.
2. Place the equipment on a secure, flat surface.
3. Connect the sample platinum resistance thermometer (PRT) to the PRT socket on the rear of the chamber.



Caution

- When connecting the equipment to a computer, always use a fully screened cable no longer than 2 m.

4. If connecting to a personal computer, connect the 9 way D type plug on the rear of the controller to an RS232 port on the computer using a Null Modem cable.
5. See [Installing the liquid nitrogen supply](#)^[10] for details on connecting the liquid nitrogen.
6. Connect the mains inlet at the rear of the chamber, to a suitable wall socket.
7. Switch on the equipment.
8. Wait for the main menu to appear.
9. [Load paper](#)^[11].

2.1.1 Installing the liquid nitrogen supply



Warning

- Installation must only be undertaken by suitably trained personnel.

Your service provider will connect the chamber to a liquid nitrogen cylinder or a Planer pump and dewar.

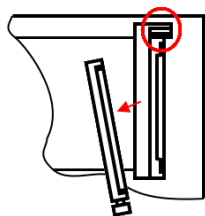
2.2 Loading printer paper



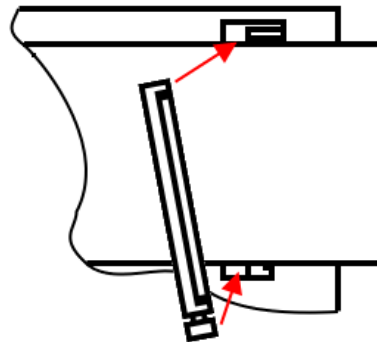
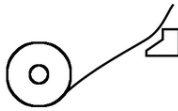
Note

- Only use thermal paper recommended by Planer plc or an authorised distributor.

1. Lift the smoked acrylic lid and the stainless steel paper shield.
2. Remove the old paper.
3. Load the thermal paper onto the paper spindle.
4. For the LTPV445 printer:

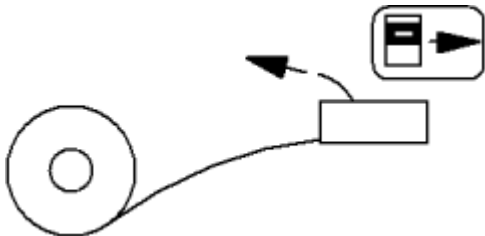


Press the lever to eject the roller.

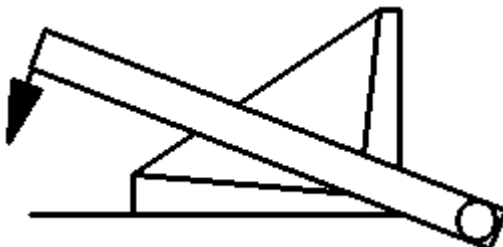


Refit the roller

5. Use the menu/right arrow key to advance the paper



6. Fold the corner and lower the stainless steel paper shield.



7. Unfold the corner.
8. Lower the smoked acrylic lid.

2.3 Using a Planer pump and dewar

This section describes how to use the Planer LNP4 pump and dewar.

2.3.1 Filling the dewar



Warning

- Wear protective clothing. See [Liquid nitrogen and vessels](#).⁵
- Never remove a pump from a dewar until the pressure gauge reading has fallen to zero.
- Only fill the dewar with liquid nitrogen.
- Do not exceed 85% of its capacity.

1. Fully insert the hose from the main liquid nitrogen storage container into the dewar to avoid spillage.
2. Slowly add the liquid nitrogen to the dewar. Cold gas will be released from the dewar.
3. Use a dipstick to ensure that the dewar is filled to between 50% and 85% of its capacity.

2.3.2 Fitting the pump



Warning

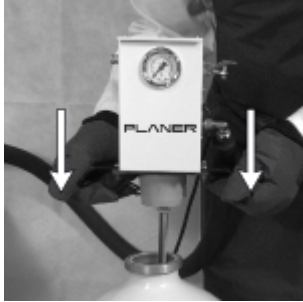
- Wear protective clothing. See [Liquid nitrogen and vessels](#).⁵
- Ensure the delivery hose from the pump to the chamber is secure.
- Ensure that the red pressure relief valve on the pump is open.



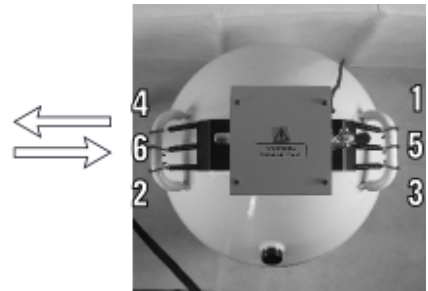
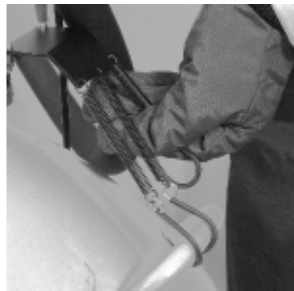
- Disconnect the mains supply at the wall socket.
- Do not insert the pump rapidly as the liquid nitrogen may bubble violently.

1. Make sure that the delivery hose is as straight as possible.

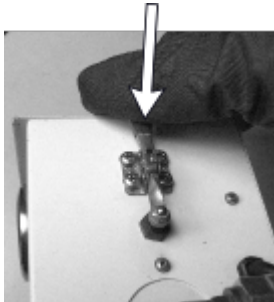
2. In one smooth and continuous action, insert the pump evenly into the neck of the dewar until the microswitch plunger operates on the neck ring. It is normal for nitrogen gas to be released from the pressure relief valve.



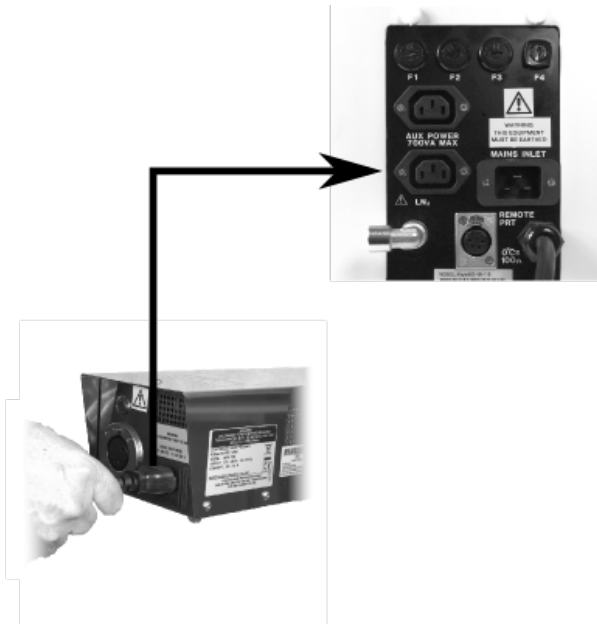
3. Press firmly on the top of the pump to hold it level and clip all the springs onto the dewar. Alternate between handles.



4. Close the pressure relief valve.



5. Connect the mains inlet of the pump power supply unit to the auxiliary power output on the rear of the chamber.



Caution

Always [test the dewar](#) ¹⁴ after fitting the pump.

2.3.3 Testing and pressuring the dewar



Warning

Wear protective clothing. See [Liquid nitrogen and vessels](#). ⁵

1. Connect the mains lead from the chamber to an appropriate wall socket.
2. Switch on the equipment.



Caution

- Do not switch on the LNP4 pump power supply while the chamber is heating.

3. Press the switch on the pump power supply unit. The adjacent light will illuminate.
4. Wait for about 5 minutes. The pressure will rise to 0.34 bar (5 psi) and the power supply light will switch off. The dewar should remain pressurised.



Warning

- Before rectifying any leaks, or to shutdown the system:
 - Switch off the equipment.
 - Disconnect the mains supply at the wall socket.
 - Open the red pressure relief valve on the pump and wait for the flow of gas to stop.



5. Check for liquid and gas leaks.

2.3.4 Removing the pump

You will need to remove the pump whenever the dewar needs to be refilled.



Warning

- Never remove a pump from a dewar until the pressure gauge reading has fallen to zero.
- Wear protective clothing. See [Liquid nitrogen and vessels](#).^[5]

1. Switch off the equipment.
2. Disconnect the mains supply at the wall socket.
3. Open the red pressure relief valve. Cold gas will issue from the valve.
4. Wait until the pressure on the gauge has fallen to zero and the flow of gas has stopped.
5. Disconnect the pump from its power supply unit.
6. Press firmly on the upper surface of the pump, then remove the spring clips from the handles on the dewar. To prevent jamming only remove one spring at a time from each side.
7. Lift the pump carefully, but firmly, out of the neck of the dewar using a slight twisting and rocking action.



Warning

The end of the pump may be cold enough to cause frostbite

8. Place the pump in a safe position on its side or suspended vertically.



Caution

- Do not overheat as the plastic parts or thermal cut-out may be damaged.
- Support the pump carefully while it is out of the dewar to avoid damage to the heating element.

9. Remove frost using a hot-air gun.

10. When the pump has reached ambient temperature, dry any condensation with absorbent tissue to prevent ice from blocking the filter when the pump is refitted.



Warning

Fit a protective cap to the dewar to prevent ice plugs forming. The cap should be in good condition and designed for use with the dewar.

2.4 Configuring the controller

2.4.1 Configuring the system



Note

Default passwords are 1111.

1. Select **Configure** from the main menu.
 2. Select **Set Time** and **Date** and enter the correct time and day. Use a 24 hour clock and enter the date in dd/mm/yyyy format.
 3. Select **Chamber/Service** and then **Select Standard chamber**. Choose the chamber matching your system. Select **Exit** to return to the Configuration menu.
 4. Select **Set Passwords**, and then select **Passwords** 1 to 3 to create new passwords for these levels.
 - Level 1 users can run programs from the controller or a computer.
 - Level 2 users can also create and edit profiles, print historical run data and system reports.
 - Level 3 users can also reconfigure the system.
 5. Use **Exit** to return to the main menu.
-

2.4.2 Entering a profile



Caution

Users must be familiar with and fully understand cryopreservation protocols and the principles of freezing profiles.

The profile defines the temperature-time profile that the equipment will follow when freezing samples. Different types of seeding can also be selected.

1. From the main menu select **Edit**.
2. Select the **Create Profile** option. If there are no free slots, make a slot available by selecting **Remove Profile** and then deleting an unused profile.
3. To create a new profile, select **Manual Entry**. If you want to copy the last run, select **From Last Run** and then select **Edit Profile** to modify the copy. The copy will be named CFG007951.
4. Enter the name of the profile.
5. Select whether you want to enter the start temperature of the profile now or when the profile is run. If you select the start temperature at run-time, the person initiating the run will be asked to enter the start temperature.
6. Select whether you want seeding enabled and the type. Two types of seeding are available:
 - a. **Manual seeding**: manual seeding requires you to define a temperature and soak time.
 - b. **Automatic seeding**: automatic seeding is for future expansion and should not be selected.
7. Enter each profile step in turn. If you make an error, continue to the end and then select **Edit Profile**. There are two types of step available:
 - a. **Ramps**: these require a rate of change and an end temperature.



Note

Never program a hold directly after ramp which ends on the sample temperature.

- b. **Holds**: these hold the chamber at the defined temperature for the desired period of time before moving onto the next step.
8. Once a profile has been created, use the **Edit | Edit Profile** menu option to make changes.
 9. To view a profile select **View Profile**.

2.5 Freezing samples

2.5.1 Preparing the nitrogen supply



Caution

Ensure that you have enough liquid nitrogen to complete your freezing run.

- If using a Planer pump and dewar, follow the instructions in [Using a ¹²Planer¹² pump and dewar¹²](#).
- If using a cylinder, refer to the manufacturer's instructions on how to switch on the supply.

2.5.2 Starting the run



Warning

Never leave the equipment unattended while running a profile.



Note

It is normal to load the samples after the chamber has reached the start temperature.



1. Switch on the equipment.
 2. Select **Run** from the main menu.
 3. Select how you want to run the profile:
 - a. If you intend to run the profile using DeltaT, select **Control from PC** and then refer to the DeltaT documentation.
 - b. If running directly from the controller, select **Run profile**.
 - i. Enter a name to identify the run.
 - ii. If the profile has been designed with a run-time start temperature, enter the required temperature.
 4. The chamber will begin to be heated or cooled until the start temperature is reached.
 5. When the start temperature is stable, the controller will beep and prompt you to load samples.
-

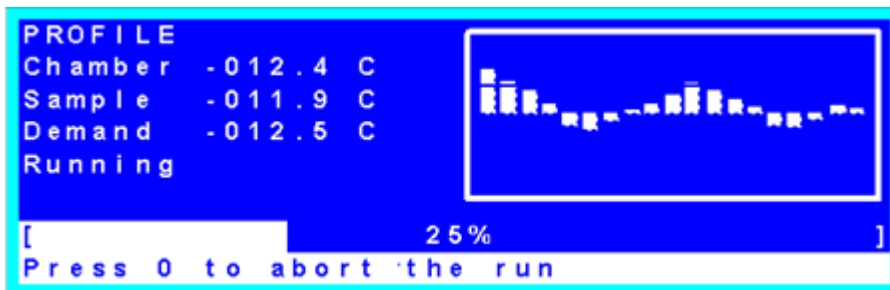
2.5.3 Loading the samples




Warning

Use tongs or wear suitable protective gloves when handling cold or hot objects.

1. Load the samples. To silence the beeping, press any key other than the  key.
2. After loading the samples, wait five minutes to allow the chamber to re-stabilise.
3. Press  on the controller to start the run.
4. The profile will now run.
5. The graph shows the control accuracy. Except during rate changes, the graph should show a narrow band.




6. If manual seeding has been selected, the controller will prompt you when the samples are ready for seeding.
 - a. When ready to resume the profile, press .
7. At the end of the run, the controller will prompt you when the samples are ready for removal. The controller will hold the chamber at the end temperature until you confirm that all samples have been removed.

2.5.4 Removing the samples



Warning

Use tongs or wear suitable protective gloves when handling cold or hot objects.

1. Remove the samples and furniture if appropriate.
2. Press  on the controller when complete.

**Caution**

Switching off the chamber at sub-zero temperatures may cause serious damage to the equipment.

3. When prompted to return the chamber to room temperature, select **Yes** to rewarm the chamber. Only select **No** if you intend to run another profile starting at a very low temperature.
4. When the chamber has warmed, the controller will return to the Run menu.

2.6 Reports

Select **Information** from the main menu.

1. Select **Print Run Data** to print an old run.
2. Select **Retrieve Last Run** to print the last run from the backup copy.
3. Select **Print System Report** to print the system details.
4. Select **System Details** to view system details on screen.

2.7 Switching off the system

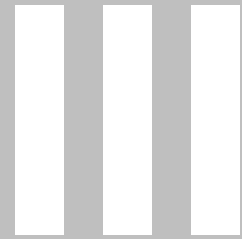
**Caution**

- Switching off the chamber at sub-zero temperatures may cause serious damage to the equipment.
- If connected to a liquid nitrogen cylinder, allow the hose to thaw and warm up to room temperature before shutting off the valve on the cylinder.

1. Return to the main menu.
 2. Select the **Shut down** menu option.
 3. Wait for the controller to shut down.
 4. Switch off the system using the mains switch on the chamber's control panel.
-

Routine maintenance and troubleshooting

Section



3 Routine maintenance and troubleshooting

3.1 Routine maintenance

Warning

- Before cleaning:
 - Switch off the equipment.
 - Disconnect the mains supply at the wall socket.
 - Turn off any connected liquid nitrogen cylinders.
 - Open the red pressure relief valve on the pump. Wait until the pressure on the gauge has fallen to zero and the flow of gas has stopped.



- Ensure that the equipment has been cleaned as necessary to ensure that it is safe to handle and service and is free from any biohazard or toxic materials.

Caution

The 1.7 chamber is fitted with a long platinum resistance thermometer (PRT). To prevent damage to the sensor, remove the lid in a vertical, straight line until the stainless steel centre tube is clear of the chamber. Do not rotate or twist the lid.

Periodically:

- Clean the equipment:
 1. Clean surface dirt with a cloth containing water and detergent.
 2. Then clean all surfaces with 70% IPA (alcohol).
 3. Finally clean the surfaces again with a cloth containing water.
- Check all nitrogen fittings.
- Check all mains cables and interconnecting cables.



Warning

- The equipment is classified as Class I equipment and must be earthed for safe operation.
 - Repetition of potentially damaging high-voltage flash tests should be avoided.
-
- To ensure adequate earth bonding, the equipment and mains cables must be regularly checked by suitably trained personnel using a Portable Appliance Tester or similar equipment.
 - The earth continuity of the mains installation must be regularly inspected by the person responsible for the safety of the installation.

3.2 Calibrating the system

The system is supplied factory calibrated.



Caution

Calibration must only be undertaken by suitably trained personnel.

The system should be calibrated at least annually by your service provider to maintain accuracy.

3.3 Troubleshooting

3.3.1 Unexpected reset

- If power is removed from the equipment, the display will go blank but the internal controller will continue to operate.
 - The alarm will sound to indicate that the internal controller is operating under internal battery power.
 - During this time, the solenoid and heater will not operate.
 - The controller will continue to monitor the chamber temperature.
- If power resumes within 1 minute:
 - The controller will display an unexpected reset message.
 - The controller will resume running the original profile.
- If power is removed for more than 1 minute:
 - The run will be terminated.

3.3.2 The run has stopped prematurely

A run could stop prematurely if, for example, the liquid-nitrogen supply is empty, there is a power failure, or the controller stops responding.

The first task is to protect the samples if at all possible.

To protect your samples

- If you can hear the solenoid valve operating normally, leave the machine running. The program will probably finish correctly.
- If the solenoid valve has stopped for more than five minutes, estimate the temperature of the samples by one of the following:
 - estimating the amount of time that the program has been running
 - reading the temperature off the display or printer or from DeltaT
 - removing the sample platinum resistance thermometer (PRT) and inserting a thermometer, suitable for use to -200 °C, into the chamber
- If the samples are above their freezing point, allow them to warm up.
- If the controller is not responding, but mains power and liquid nitrogen are available and the samples are below their freezing point, press the Manual Override Key and the Manual Cool key together on the front of the controller to go to the final temperature.
- When you have removed the samples, press the Reset button on the back of the controller.

3.3.3 The chamber will not cool



Warning

Refer to the [safety instructions](#) ⁴ at the front of this manual.

- Check the nitrogen supply.
- Check the fuses.
- If using a Planer pump, check that the pump filter is not blocked by ice.

3.3.4 The chamber will not heat



Warning

Refer to the [safety instructions](#) ⁴ at the front of this manual.

- Check the fuses.
-

- Wait until the thermal cut-out resets in case the chamber had overheated.

3.3.5 No response from the system



Warning

Refer to the [safety instructions](#) ⁴ at the front of this manual.

- Check the mains supply.
- Check that the lid of the chamber is seated properly.
- Check the fuses.
- Press the Reset button on the back of the controller.

3.3.6 The display is blank

If the display is illuminated but is entirely white or blue, adjust the contrast wheel located on the right-hand side of the controller.

3.3.7 Returning for service

Should the equipment or any part of the equipment need to be sent back to Planer plc for repair, or if the equipment is to be inspected, maintained or repaired on-site by Planer plc personnel, a Decontamination Certificate must be completed. This can be downloaded from <http://www.planer.com/support/service/decontamination-certificate.html>.

3.4 Disposal



- Do not dispose of with general waste.
- Ensure that the equipment has been cleaned as necessary to ensure that it is safe to handle and service and is free from any biohazard or toxic materials.

Additional information

Section

IV

4 Additional information

4.1 Specifications

4.1.1 System specifications

Accuracy	$\pm(0.3 + 0.005 \times TM)$ °C (where TM is the magnitude of the temperature).
Storage temperature	-10 °C to +50 °C
Storage humidity	5% to 95% relative humidity non-condensing
Operating environment	For indoor use only
Operating temperature	+5 °C to +40 °C
Operating humidity	5% to 90% relative humidity non-condensing
Altitude	up to 2000 m
Pollution degree	Pollution degree 2 (BS EN61010-1)
Sound pressure level	< 70 dB(A)

4.1.2 Controller specifications

Feature	MRV	MRV light
Heating rates	0.01 to 10 °C/min	upgrade required
Cooling rates	-0.01 to -50 °C/min *	-0.01 to -30 °C/min
Temperature range	+40 to -180 °C/min	ambient to -100 °C
Printer	320/640 dot thermal printer STP411 or 832 dot thermal printer LTPV445	upgrade required
PC interface to DeltaT	RS232	upgrade required
Dimensions	80 mm high x 220 mm wide x 350 mm deep	
Weight	2.6 kg approx.	
Display	240 x 64 LCD with CCFL backlight	
Keypad	20 key membrane keypad	
Number of profiles	10	
Steps per profile	32	
Number of stored runs	5	
Maximum profile length	9 hours	

* programmable to -99.9 °C/min.

4.1.3 Chamber specifications

Kryo chamber	320-1.7	360-1.7	360-3.3	520-16 560-16
Weight kg	14.4	14.4	14.7	23
Capacity litres	1.7	1.7	3.3	16
Dimensions mm	200 x Ø150	200 x Ø150	400 x Ø150	320h x 226w x 230d chamber access 217 x 217
0.25 mL straws	60	60	60	608 horizontal 250 vertical
0.5 mL straws	45	45	45	608
2 mL ampoules	30	30	60	726
50 cc blood bags	-	-	-	22
250 cc blood bags	-	-	-	11
500 cc blood bags	-	-	-	11
Power requirements (see note) Includes MRV Controller	115 V~ ±10% 50/60Hz 10 A	115 V~ ±10% 50/60Hz 10 A	115 V~ ±10% 50/60Hz 10 A	115 V~ ±10% 50/60Hz 15 A
	230 V~ ±10% 50/60Hz 5 A	230 V~ ±10% 50/60Hz 5 A	230 V~ ±10% 50/60Hz 5 A	230 V~ ±10% 50/60Hz 10 A

Note. The equipment is designed to be connected to an Installation Category (over-voltage category) II mains supply as defined in IEC 60364-4-443

4.1.4 Fuses



Warning

- There are no user replaceable fuses.
- Internal fuses should only be replaced by suitably trained service personnel.
- For continued protection against risk of fire, fuses must always be replaced with fuses of the same type and rating.

Kryo 320-16, 360-1.7 and 360-3.3

	F1 and F2	F3
115V ~ model	T 10A H 250V (Planer # FL013299)	T 5A L 250V (Planer #FL013801)
230 V~ model	T 5A L 250V (Planer #FL013801)	T 2.5A L 250V (Planer #FL012026)

Kryo 520-16 and 560-16

	F1 and F2	F3	F4
115V ~ model	F 15A H 250V (Planer #FL011916)	F 12A L 250V (Planer #FL011915)	T 6.25A L 250V (Planer #FL011911)
230 V~ model	F 10A L 250V (Planer #FL011913)	F 6A L 250V (Planer #FL011912)	T 3A L 250V (Planer #FL011909)

4.2 External alarms

The rear of the controller is fitted with an RJ45 connector (Alarm/Autoseeder) which is normally used for connecting to an external alarm.



Warning

- Installation must only be undertaken by suitably trained personnel.
- Any electrical devices connected to the equipment must comply with either IEC 950, IEC 61010 or their equivalent.
- Do not use the alarm for any safety critical application.

Contact your service provider for further details.

4.3 EU Declaration of Conformity

The EU Directives covered by this declaration

2004/108/EC EMC Directive
2011/65/EU RoHS Directive
2006/42/EC Machinery Directive

The products covered by this declaration

Equipment name:

16L Chamber + MRV Controller - Non-Medical Device Version
MRV Series - Non Medical Devices

Model numbers:

GDKRYO520-16-230, GDKRYO520CH-16-230
GDKRYO560-16-230, GDKRYO560CH-16-230
GDKRYO320-1.7-230, GDKRYO320CH-1.7-230,
GDKRYO360-1.7-230, GDKRYO360CH-1.7-230,
GDKRYO360-3.3-230, GDKRYO360CH-3.3-230,
GDMRV, GDMRV-L,
GDMRV-ADAPTOR

The basis on which conformity is being declared

The products identified above comply with the essential requirements of the above EU Directives by application of the following standards:

BS EN50581: 2012
BS EN61010-1:2010
BS EN61326-1:2013
BS EN ISO 14971: 2012
BS EN ISO 13485: 2012

ATTENTION

The attention of the specifier, purchaser, installer or user is drawn to special measures and limitations of use which must be observed when the product is taken into service to maintain compliance with the above directives. Details of these measures, if any, are given in the instructions supplied with the products.

MA102747-EN ver: 5

Series 300 & 500: Instructions for Use

Planer plc. 110 Windmill Rd., Sunbury, Middlesex, TW16 7HD, UK