LyoDry Tray Drying Accessory
INSTALLATION AND OPERATION MANUAL

Issue	**4**
Date	**27/09/20**

PLEASE READ THIS DOCUMENT BEFORE OPERATING THE EQUIPMENT

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1. INTRODUCTION

1.1 Purpose

This manual provides installation and operation instructions for the LyoDry Tray Drying Accessory.

The following ranges of accessories are designed for applications where materials are to be freeze dried on open trays. They are designed for use in conjunction with the LyoDry™ base units: Compact and Midi.

This manual and all accompanying documentation must be read before operating the vacuum system.

Important safety information is highlighted as **WARNING** and **CAUTION** instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS are defined below.

1.2 General safety

WARNING: Warnings are given where failure to observe the instruction could result in injury or death to persons.

CAUTION: Cautions are given where failure to observe the instruction could damage to the equipment, associated equipment or process.

2. ACRYLIC CHAMBER

The acrylic chamber is used for bulk drying material in beakers or on rack-mounted trays. It is useful where radiant heat is required or where a visual check of the product is necessary during the drying process.
The chamber comprises an open-ended acrylic cylinder, complete with neoprene sealing gaskets at the top and bottom. It must be used in conjunction with the acrylic lid accessory.

SPECIFICATIONS AND DATA

Reference no:	LSDC
Diameter:	350 mm (13.79 in)
Height:	435 mm (17.14 in)

3. ACRYLIC LID

The acrylic lid accessory is a 25mm (0.98 in.) thick disc of acrylic plastic.

SPECIFICATIONS AND DATA

Reference no:	LSLID
Diameter (outside):	365 mm (14.38 in)
Thickness:	25 mm (0.98 in)

4. ACRYLIC LID WITH 8 PORTS

The acrylic lid accessory is a 25mm (0.98 in.) thick disc of acrylic plastic with single blanked-off entry supplied with removable plug and can be easily upgraded for use with the temperature controller option.

SPECIFICATIONS AND DATA

Reference no:	LSVLID
Diameter (outside):	365 mm (14.38 in)
Thickness:	25 mm (0.98 in)
Vacuum isolation valves:	3/4" ID x 8

5. RACK ASSEMBLY

The rack assembly consists of a stainless steel “rib cage” unit which forms part of the heated tray assembly. It will accommodate up to six trays and/or six heater mats, allowing use of different size containers. The rack has six sockets which are pre-wired so that the heater mats may be plugged directly into the rack.

The rack assembly is designed for use in conjunction with the following accessories:

- Acrylic chamber (LSDC)
- Product trays (LSDT1 x6)
- Heater mats (LSHM)
- Temperature controller (LSTM)

SPECIFICATIONS AND DATA

Reference no:	LSD6
Diameter:	300 mm (11.82 in)
Height:	425 mm (16.74 in)
Typical Shelf Spacing:	60 mm (2.36 in)
Shelf Area:	
4 Shelf:	0.24 m^2 (0.77 ft^2)
6 Shelf:	0.36 m^2 (1.16 ft^2)

6. PRODUCT TRAY

The product tray is pressed from stainless steel and is designed for use with the rack assembly. Its normal application is for use when freeze drying bulk products and it may be used with or without the heater mat accessory.

SPECIFICATIONS AND DATA

Reference no:	LSDT1
Diameter (outside):	284 mm (11.19 in)
Depth:	25 mm (1 in)
Area:	0.059 m^2 (95 in^2)
Volume (per cm depth):	594 ml (36 in^3)

7. HEATER MAT

The heater mat accessory is used to provide a controlled heat input to bulk materials during the freeze drying process. The heater mat, when plugged into the spine of the rack accessory, forms a heated tray unit.
The mat consists of an electrical resistance heater element enclosed in glass fibre. Internal overload protection is provided by an internal safety thermostat and set at 100°C. Sockets are also provided for a control temperature feedback probe.

SPECIFICATIONS AND DATA

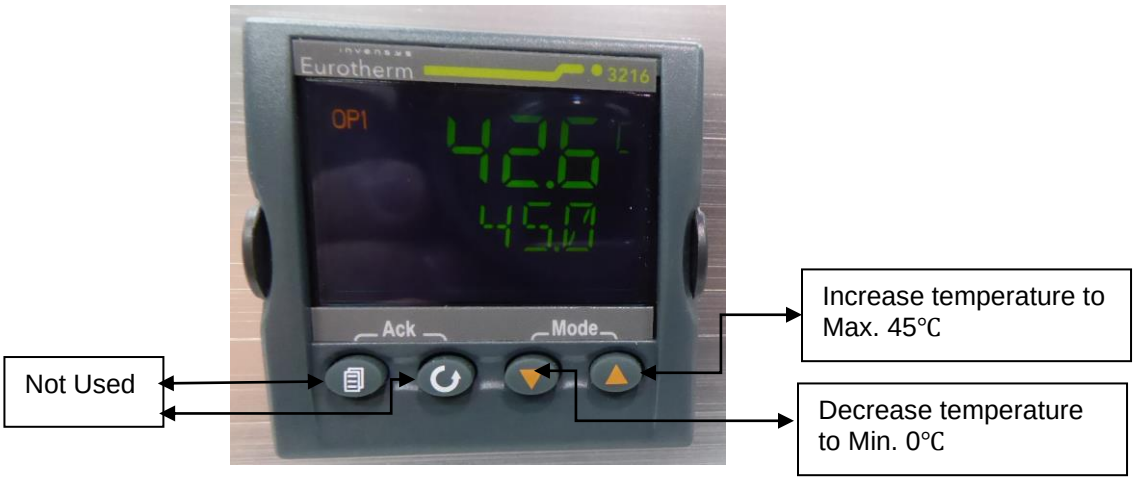
Reference no:	LSHM
Diameter:	275 mm (10.83 in)
Thickness:	8 mm (0.31 in)
Power consumption:	50 W at 50 V 50/60 HZ

8. TEMPERATURE CONTROLLER

The temperature controller assembly is a free-standing power supply that delivers a thermostatically controlled low voltage A C electrical supply to heater mats. The controller is housed in a drip-proof enclosure and is supplied complete with power lead and electrical lead-throughs to fit the acrylic lid accessory, a heater mat probe (thermocouple), and a power plug for the rack assembly. The controller regulates the heat input to the mat by monitoring the temperature of the mat and comparing it with the value of the set point (0°C – 45°C). The temperature display on the controller indicates the temperature local to the heater mat probe.
Note that the temperature will not be uniform throughout the product. For example, it is quite possible to have the temperature for the heater mat set to +30°C while the product is temperature remains at -20°C.

SPECIFICATIONS AND DATA

Reference no:	LSTM
Dimensions:	
Width:	254 mm (10 in.)
Height:	140 mm (5.5 in.)
Depth:	165 mm (6.5 in.)
Electrical Supply:	
Input:	220/240 V Single Phase 50/60 Hz
Output:	50V A.C. at 7A



9. TRAY CELL (LSAD6)

The Tray Cell is a package composed of the Acrylic Chamber and Acrylic Lid, Rack Assembly, and six Product Trays. It can be used in conjunction with the Temperature Controller and up to six Heater Mats.

10. DRYING TRAY KIT (LSAD6H)

The Drying Tray Kit is composed of the Rack Assembly and six Product Trays. It is intended for those who already use the Acrylic Chamber and Lid, but wish to upgrade their system with tray drying capability. The kit may be used with the Temperature Controller and up to six Heater Mats.

11. USE OF TRAY ACCESSORIES

The following instructions are provided as a guide to the correct method of freeze drying using a range of accessories. Ignore any steps referring to accessories not in use. All instructions should be read in conjunction with the operating instructions supplied with the freeze drying base unit.
Before using any new electrical item, connect its electrical supply lead to a fused plug (fused at 1.5A-240VAC) as follows:

Brown lead	Live Terminal
Blue lead	Neutral Terminal
Green/yellow lead	Earth Terminal

Prior to assembling any accessories onto the base unit, ensure that all mating surfaces and seals are wiped clean and that they are all serviceable. Proceed as follows:

1. Pre-freeze the product in the appropriate container (i.e. beaker, tray, flask, ampule, etc.)
2. Prepare the freeze dryer base unit for operation in accordance with its operating instructions. Switch on the electrical supply and the refrigerator.
3. When the condenser temperature reaches -40 °C, assemble the accessory onto the flange of the base unit. If fitting the rack accessory, do not fit the acrylic chamber until after the other accessories and product have been loaded.
4. If using the rack accessory, place it in position over the condenser port.
5. If required, fit the heater mats to the rack by pushing the plug connections into the sockets on the spine.
6. Product trays can be loaded onto the rack accessory by inserting them between the short upper ribs so that they are supported on the lower ones.
7. Fit the acrylic chamber or manifold accessory.

CAUTION: Beakers or flasks placed inside the acrylic chamber must be supported over the condenser port by a rack or raised back plate. DO NOT OBSTRUCT THE PORT OPENING.

8. If a temperature controller is to be used , connect the coloured leads to the identically coloured sockets as follows:

   Red sheath on grey wire - From power pack/temperature controller to the acrylic lid and from the lid to the sockets at the top of the rack.

   Yellow sheath on grey wire - From the temperature controller to the acrylic lid and from the lid to the heater mat (shelf temperature) probe.

   Insert the thermocouple into the heater mat assembly.

9. Switch on the vacuum pump and check that its gas ballast valve is open. Allow the vacuum pressure to stabilize.
10. Switch the temperature controller pack MAINS switch to “1”.
11. Set the temperature controller to the maximum temperature required at the product.

    The freeze drying process is now taking place. Ensure that the product is completely dry before starting the shutdown procedure.

12. Switch the temperature controller pack MAINS switch to “O”.
13. Switch off the vacuum pump.
14. Slowly open the drain/air admittance valve on the base unit until the chamber accessory has reached atmospheric pressure.
15. Remove the product.
16. Prepare the freeze dryer base unit for another cycle or storage, as instructed in the unit’s own working instructions.

WARNING: The internal surface of the freeze dryer base unit may be subject to extreme of temperature. In the interests of safety, care should be taken when loading or unloading a product.

12. MAINTENANCE OF ACCESSORIES

The rubber components on the accessories may eventually deteriorate and need replacing. The effective life of rubber parts depends upon both their usage and the surrounding environment.

Monthly

Check all rubber hoses and gaskets and replace any that show signs of hardening, permanent set or deterioration.

Use a soft cloth or sponge and a mild, non-abrasive soap or detergent, to clean the surfaces of the accessory.

Polishes may be used on the exterior metal surfaces.

Do not use solvents.